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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/517,102

12/07/2004

Takayuki Abe

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1040

23432 7590 01/05/2007
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EXAMINER

LEACH, CRYSTAL I

ART UNIT

PAPER NUMBER

3737

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/05/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/517,102	ABE ET AL.	
	Examiner	Art Unit	
	Crystal I. Leach	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/6/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement (IDS). Specifically, the reference cited on p. 1, lines 23-25, is not on the IDS. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.
2. The information disclosure statement filed on January 6, 2005 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. Specifically, a copy of the Kessler et al. reference has not been provided. It has been placed in the application file, but the information referred to therein has not been considered.
3. The following is a quotation of the sixth paragraph of 35 U.S.C. 112:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Regarding claims 1,2,3,6 and 8, "means for " language is followed by a specified

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function. Examiner interprets the use of this language as intent to invoke 35 U.S.C. 112, sixth paragraph. However, since the "means for" functional language is not specifically defined in the written description, proper examination of the particular "means" applicant deems as capable of performing each function is unknown. Therefore, claims 1,2,3,6 and 8 do not invoke 35 U.S.C 112, sixth paragraph.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 2, and 6-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Kaufman et al. (6,690,961).

6. Regarding claim 1, Kaufman et al. teach a magnetic resonance imaging apparatus (Abstract, line 1) comprising: an imaging means capable of applying high-frequency magnetic fields and gradient magnetic fields to an object to be placed in a static magnetic field in accordance with a pulse sequence of dynamic measurement for continuously obtaining a plurality of time-series images and for measuring NMR signals emitted from the object to be examined (col.1, lines 57-67; col. 4, lines 27-40), a signal processing means capable of forming images of a desired tissue of the object to be

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examined from the NMR signals (col. 1, lines 64-67; col. 5, lines 55-57 and 61-67), a display means capable of displaying the images (col. 4, lines 62-64), and a control means capable of controlling the imaging means and the signal processing means (col. 4, lines 43-55; col. 5, lines 55-67); wherein the imaging means is provided with a monitoring mode in which a desired slab of the object to be examined is measured using a pulse sequence (col. 7, lines 17- col. 5, lines 4-43; col. 6, lines 43-46) for the dynamic measurement under a condition of applying gradient magnetic fields with a low spatial resolution and a substantial measurement mode in which the same slab is measured using the same pulse sequence under a condition of applying gradient magnetic fields with a high spatial resolution, and the control means has a mode switching means capable of switching from the monitoring mode to the substantial measurement mode and the switching means switches the monitoring mode to the substantial measurement mode with desired timing during the monitoring mode is performed (col. 5, line 35 – col. 7, line 29; col. 7, lines 57-58). See figure 1.

Regarding claim 2, Kaufman et al. teach that the apparatus is capable of extracting reference data from the dynamic measurement data acquired in the monitoring mode, and a temporal change of the extracted reference data is displayed on said displaying means (col. 7, lines 17-23 and lines 30-46).

Regarding claim 6, Kaufman et al. teach control means capable of controlling the signal processing means (col. 4, lines 43-64; col. 5, lines 55-67), when images are reconstructed immediately after the substantial measurement mode begins, so as to

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reconstruct images using data including data acquired in the pulse sequence performed previously (col. 7, lines 39-49 and lines 57-58).

Regarding claim 7, Kaufman et al. teach an apparatus capable of transforming three-dimensional data of the time-series images to a two-dimensional projected image to be displayed on said display means (col. 1, lines 36-40; col. 4, line 62 – col. 5, line 3; col. 8, lines 11-13).

Regarding claim 8, Kaufman et al. teach that the mode switching means has an input means for mode switching (col. 4, lines 41-43), and the monitoring mode is switched to the substantial measurement mode by directly inputting a switching instruction to said mode switching means (col. 4, lines 43-45; col. 7, lines 17-23 and 47-49; col. 6, lines 39-43).

Regarding claim 9, Kaufman et al. teach that the gradient magnetic fields include a slice encode, a phase encode and a frequency encode for the two-dimensional or three-dimensional measurement (col. 4, lines 33-35; col. 6, lines 49-53; col. 8, lines 8-12; col. 6, lines 35-39). Since the physician or operator using the apparatus as taught by Kaufman et al. is capable of changing these parameters, the particular way in which they are executed is dependent on the desired diagnostic procedure of the physician or operator.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. (6,690,961).

Kaufman et al. teach that low resolution images, which are images taken during the monitoring mode, are first acquired near the center of K-space (col. 8, lines 57-59) and that higher resolution images, which are images associated with substantial measurement mode imaging, are acquired after a few pulse sequence duration (TR) periods. See col. 8, lines 59-60.

It would have been obvious to one of ordinary skill in the art at the time of the invention to understand that a signal value will be detected at or near the origin of the k-space and that since low resolution images are generated when acquisition is started near the center of the K-space, the signal value detected at the center of the k-space is indicative of being in a monitoring mode. Furthermore, it is known that as the TR periods increase, the K-space will be scanned further away from its center, and as Kaufman et al. teach, higher resolution images will be generated indicating a switch from monitoring mode to substantial measurement mode. Examiner notes that the predetermined threshold value as taught by Kaufman et al. would be the number of TR periods.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. (6,690,961) in view of Geraats et al. (WO 02/04970).

Kaufman et al. do not explicitly teach the reference data as NMR signals acquired in the monitoring mode

Geraats et al. teach the reference data as NMR signals acquired in the monitoring mode (p.2, line 23 – p. 3, line 25).

It would have been obvious to one having ordinary skill in the art at the time of the invention to include reference data in the form of NMR signals acquired in the monitoring mode for determination of switching between monitoring mode and substantial measurement mode in the invention taught by Kaufman et al., in light of the teachings of Geraats et al. in order to add an additional control feature for the assurance of high quality MR vascular imaging (col. 1, line 47).

10. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. (6,690,961) in view of Geraats et al. (WO 02/04970).

Kaufman et al. teach an apparatus capable of MR vascular imaging (col. 1, lines 43-56). As stated above, the physician or operator using the apparatus as taught by Kaufman et al. is capable of changing parameters, such as slice encode, therefore, the particular way in which a parameter is executed is dependent on the desired diagnostic procedure of the physician or operator.

Kaufman et al. do not explicitly teach an apparatus capable of blood imaging for observing a change of blood flow using a contrast agent, wherein a difference image between the blood images acquired before and after injection of the contrast agent is displayed on the displaying means.

It is well known in the art to use angiography for measuring and/or assessing blood flow. Geraats et al. teach an apparatus capable of blood imaging for observing a change of blood flow using a contrast agent (p. 1, line 26 – p. 2, line 11), wherein a difference image between the blood images acquired before and after injection of the contrast agent is displayed on the displaying means (p. 4, line 32- p. 5, line 7).

It would have been obvious to one having ordinary skill in the art at the time of the invention to include blood imaging for observing a change of blood flow using a contrast agent, wherein a difference image between the blood images acquired before and after injection of the contrast agent is displayed on the displaying means in the Kaufman et al. invention, in light of the teachings of Geraats et al. in order to improve medical diagnosis provided from MR vascular imaging as taught by Kaufman et al (col. 1, lines 43-47).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Taniguchi et al. (6,222,365) teach a magnetic resonance imaging apparatus and method; Fain et al. (6,459,264) teach real-time embedded magnetic resonance fluoroscopy; Harvey et al. (6,577,127) teach a magnetic resonance imaging method for imaging time-dependent contrast; Mistretta et al. (5,713,358) teach a method for producing a time-resolved series of 3D magnetic resonance angiograms during the first passage of contrast agent; Kuhara (6,946,836) teaches magnetic resonance imaging involving movement of patients couch; Yamamoto et al (5,045,791)

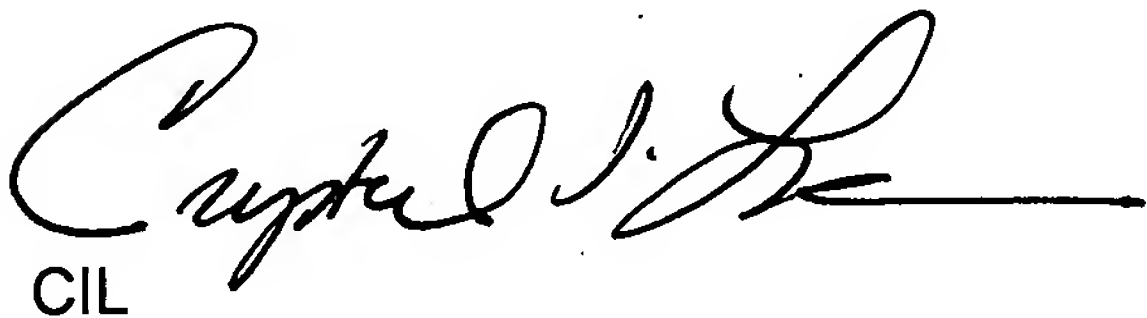
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teach a nuclear magnetic resonance imaging method; Anand et al. (6,639,211) teach a contrast-enhanced MRA including an effective zero-latency method of bolus detection; Wang et al. (5,827,187) teach dynamic MR digital subtraction angiography with complex subtraction; Riederer (4,830,012) teaches a high speed NMR imaging method and apparatus; Carroll et al. (6,195,579) teach contrast detection and guided reconstruction in contrast-enhanced magnetic resonance angiography; Debbins et al. (6,603,992) teach a method and system for synchronizing magnetic resonance image acquisition to the arrival of a signal-enhancing contrast agent; Watanabe ('642) teaches a magnetic resonance imaging apparatus and ('496) a method and apparatus for producing a magnetic resonance angiogram; Vigen et al. (6,044,290) teach time-resolved digital subtraction magnetic resonance angiography using echo-planar imaging; Watanabe et al. (6,097,185) teach a magnetic resonance imaging apparatus; Laub (5,474,067) teaches a method for time-resolved MR-imaging; Beck et al. (6,653,834) teach a magnetic resonance imaging method; and Meyer et al. (5,485,086) teach continuous fluoroscopic MRI using spiral K-space scanning.

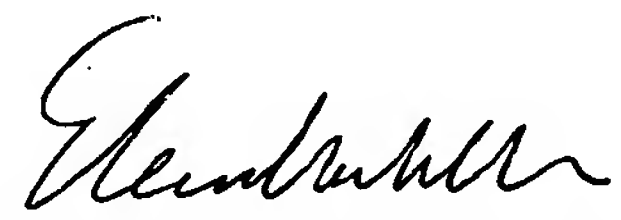
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Crystal I. Leach whose telephone number is 571-272-5211. The examiner can normally be reached on Monday through Friday, 8 am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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